



**U.S. Army Defense Ammunition Center**



# **DDESB Seminar**

## **Explosives Safety Training**

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# Distance Learning/ Instructor-Led Training



	Explosives Safety	Logistics	HAZMAT & Packaging	Surveillance/ Ammunition	Total Courses
Distance Learning (DL)	20	7	7	15	49
Instructor-Led Training (ILT)	10	6	4	12	32
	30	13	11	27	81

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# Distance Learning/ Instructor-Led Training



## Explosives Safety

### Distance Learning (DL)

Ammo-18 (Basics of Naval Explosives Hazard Control)  
Ammo-28 (Electrical Explosives Safety for Army Facilities)  
Ammo-29 (Electrical Explosives Safety for Naval Facilities)  
Ammo-31 (Environmental Considerations for Ammunition Personnel)  
Ammo-36 (Explosives Safety for Naval Facility Planning Ref Training)  
Ammo-47 (Lightning Protection for Air Force Facilities)  
Ammo-49 (Naval Explosives Safety Mgrs/Supervisors Orientation)  
Ammo-51 (Naval Motor Vehicle and Railcar Inspection)  
Ammo-54 (Risk Mgmt and Preparation of SOPs for A&E Operations)  
Ammo-63 (US Army Explosives Safety)  
Ammo-69 (Shipboard Explosives Safety)  
Ammo-87 (Military Munitions Response Program (MMRP))  
Ammo-99 (Application of US Army Explosives QD Principles)  
Ammo-100 (US Army Explosives Safety Site Planning)  
Ammo-101 (Tutorial DDESB Automated QD Calc (Army))  
Ammo-102 (Tutorial DDESB Automated QD Calc for Navy, Air Force, Marines)  
\*Ammo-103 (Explosives Safety Siting System)  
\*Ammo-104 (Army ESS Asset)  
\*Explosives Safety Awareness in NATO and Multi- National Operations  
\*Explosives Safety "Rosetta Stone"

\*under development

### Instructor-Led Training (ILT)

Ammo-28 (Electrical Explosives Safety for Army Facilities)  
Ammo-29 (Electrical Explosives Safety for Naval Facilities)  
Ammo-31 (Environmental Considerations for Ammunition Personnel)  
Ammo-33 (Explosives Safety and Environmental Risk Management)  
Ammo-36 (Explosives Safety for Naval Facilities Planning)  
Ammo-47 (Lightning Protection for Air Force Facilities)  
Ammo-51 (Naval Motor Vehicle and Railcar Inspection)  
Ammo-54 (Risk Mgmt and Preparation of SOPs for A&E Operations)  
Ammo-74 (Explosives Safety Officer Orientation)  
Ammo-82 (US Army Explosives Safety Quantity Distance)

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# Distance Learning/ Instructor-Led Training



## Explosives Safety (by Service)

### Army

Ammo-28 (Electrical Explosives Safety for Army Facilities)  
Ammo-31 (Environ Considerations for Ammunition Pers)  
Ammo-54 (Risk Mgmt and Prep of SOPs for A&E Ops)  
Ammo-63 (US Army Explosives Safety Familiarization)  
Ammo-87 (Military Munitions Response Program (MMRP))  
Ammo-99 (Application of US Army Exp QD Principles)  
Ammo-100 (US Army Exp Safety Site Planning Course)  
Ammo-101 (Tutorial DDESB Automated QD Calc (Army))  
\*Ammo-103 (Explosive Safety Siting System)  
\*Ammo-104 (Army ESS Asset)  
\*Explosives Safety Awareness in NATO and Multi- National Operations  
\*Explosives Safety "Rosetta Stone"

### Navy/Marine Corps

Ammo-18 (Basics of Naval Explosives Hazard Control)  
Ammo-29 (Electrical Explosives Safety for Naval Facilities)  
Ammo-36 (Exp Sfty for Naval Facility Planning Ref Trng)  
Ammo-49 (Naval Explosives Sfty Mgrs/Spvrs Orientation)  
Ammo-69 (Shipboard Explosives Safety)  
Ammo-102 (Tutorial DDESB Automated QD Calc), Navy, Air Force, & Marines)  
\*Explosives Safety Awareness in NATO and Multi- National Operations  
\*Explosives Safety "Rosetta Stone"

### Air Force

Ammo-47 (Lightning Protection for Air Force Facilities)  
\*Explosives Safety Awareness in NATO and Multi- National Operations  
\*Explosives Safety "Rosetta Stone"

Ammo-28 (Electrical Explosives Safety for Army Facilities)  
Ammo-31 (Environ Considerations for Ammunition Pers)  
Ammo-54 (Risk Mgmt and Prep of SOPs for A&E Ops)  
Ammo-82 (US Army Explosives Safety Quantity Distance)

Ammo-29 (Electrical Explosives Safety for Naval Facilities)  
Ammo-33 (Explosives Safety and Environ Risk Mgmt)  
Ammo-36 (Explosives Safety for Naval Facilities Planning)  
Ammo-74 (Explosives Safety Officer Orientation Course)

Ammo-47 (Lightning Protection for Air Force Facilities)

\*under development

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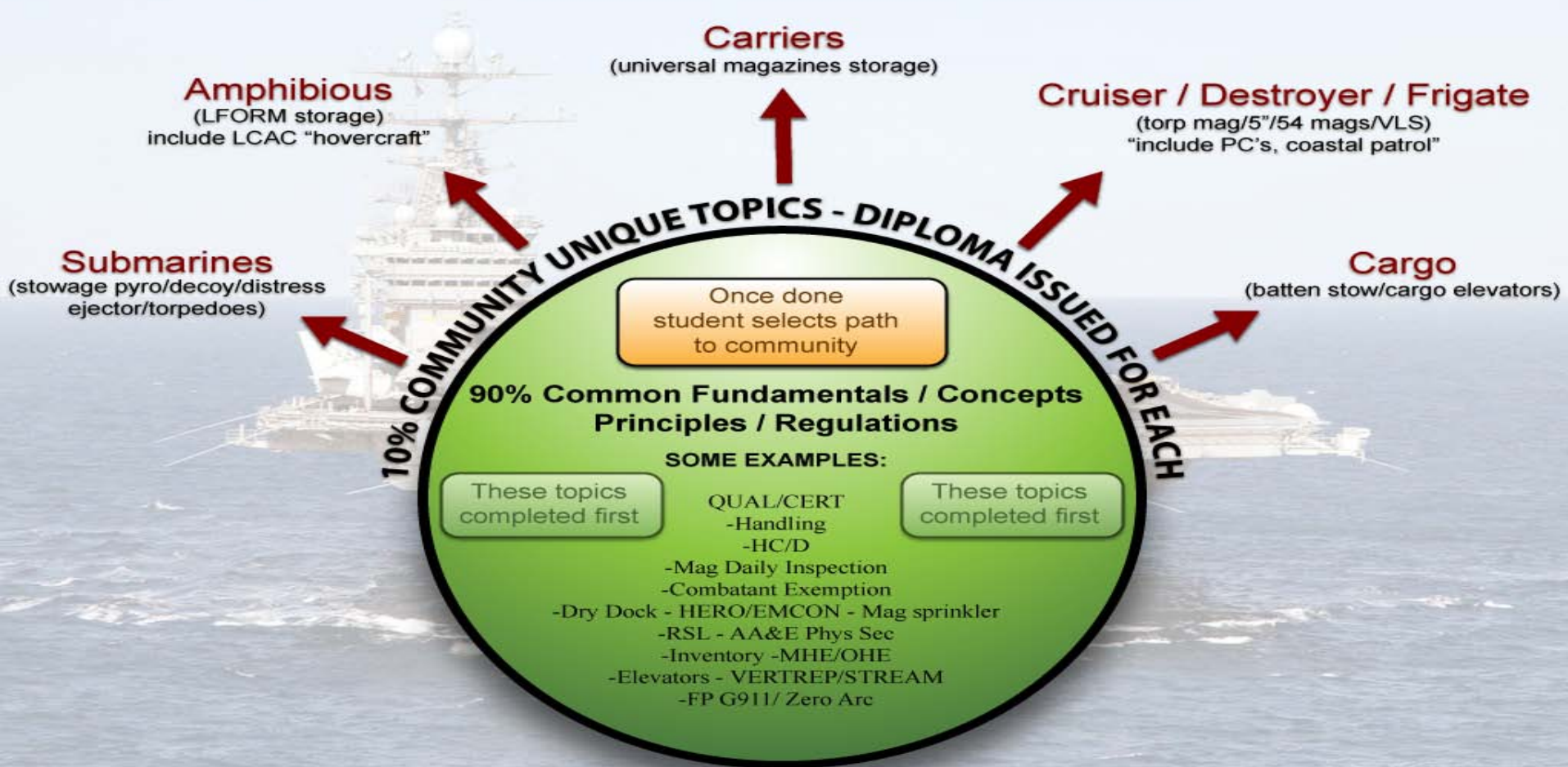




# Shipboard Explosives Safety



## AMMO-69 DL PROPOSED ARCHITECTURE



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# Shipboard Explosives Safety



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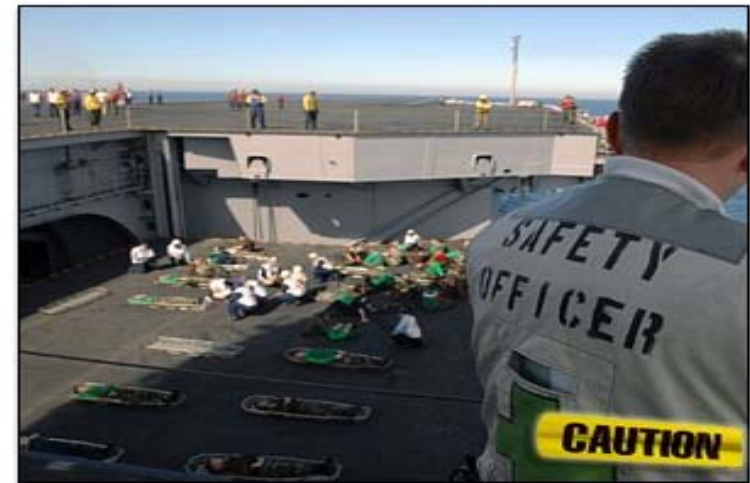
Elevators Operating Requirements

## Elevator Area Safety

Prior to operating an elevator, any elevator operator must visually inspect the surrounding area of operations for personnel or obstructions that would interfere with the safe operation of the elevator.

For elevators that do not have interlocked doors, prior to initiating any operation, the master control station operator or supervisor must ensure that all doors are in place or closed, except at those levels where loading or unloading the platform will take place.

**CAUTION:** Elevators shall never be operated with a known defective safety feature.



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RAM, VLS, and Gun Mounts Material Condition

## RAM, VLS, Gun Mounts and Launcher Labels, Signs, and Placards Observer Precautions

The primary personnel safety concerns during missile or rocket launches are fragmentation, toxic gas, and noise. The following requirements apply for on-deck observer locations:

- Observers are not allowed within the defined blast area
- Observation areas should avoid direct line-of-sight to the launcher



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# Shipboard Explosives Safety



Heat Sensing Device

HEAT

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Magazine Stowage Requirements

## Stowage Areas

Stowage areas are arranged to provide access to as much ammunition, and to as many containers as possible, and to provide adequate space for ventilation and handling operations.

Ammunition and explosives must be stowed and secured for sea, so that all parts of the magazine and stowage will receive maximum ventilation and exposure to the sprinkler system.



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Magazine Stowage Requirements

## Air Space

The air space between the stowage stack and the surface of adjacent plating (e.g., ship's bulkhead, hull, frames, etc.) must not be less than 2 inches, except in:

- Adjustable batten stowage
- "Pogo Stick" systems
- Modular ammunition stowage systems
- Deck gratings or universal tie-down deck grids where the ammunition or explosives may sit directly on the grating or grid

**CAUTION:** The stowage shall not obstruct F circuit sensors or air escape lines, and shall have a minimum clearance below the sprinkler heads as specified in NAVSEA S9522-AA-HBK-010.



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Magazine Stowage Requirements

## Stowage Segregation

When several lots of ammunition and explosives are stowed in the same storage area or magazine, they should be segregated by lot numbers.

Unserviceable ammunition should be stowed in magazine locations that minimize the risk of accidental use, marked accordingly, and segregated from serviceable ammunition.



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# Shipboard Explosives Safety



Submarines Torpedo Room

## Torpedoes

Submarines carry the Mk 48, Mods 4, 5, 6, and 7 Warshot and Exercise Torpedoes. These torpedoes are stowed aboard submarines fully ready for tube loading and launching. Submarines are authorized to stow torpedoes with warheads assembled.

The torpedoes are normally shipped in protective shipping and storage containers or combination launcher-containers. Only the handling equipment specified for the torpedo should be used when outside of its container.



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# Shipboard Explosives Safety



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Submarines Torpedo Room

## Otto Fuel II

A major safety concern within the torpedo room is exposure to Otto Fuel II. Otto Fuel II is the propellant for the Mk 46, Mk 48, Mk 48 Advanced Capability (ADCAP), and Mk 54 torpedoes.

In use, Otto Fuel II is first sprayed under pressure into a combustion chamber, then ignited. The exhaust gases from the burning fuel are used to drive the torpedo engine. A major advantage of these systems is the capability of turning around or reusing exercise weapons.



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# Shipboard Explosives Safety



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Submarines Torpedo Room

## Otto Fuel II Spill

Otto Fuel II spills appear as a bright yellow color in a thin layer, or a reddish-orange color when the spill is large. All leaks and spills must be kept to a minimum and be cleaned up at once.

The use of solvents to cleanse Otto Fuel II from the skin is prohibited (solvents tend to speed up the absorption of the fuel into the skin and magnify the effects of the exposure).



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# Shipboard Explosives Safety



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Submarines Torpedo Room

## Otto Fuel II Spill Kit

Otto Fuel II spills cause two major safety concerns. First, toxic effects may occur from absorption of Otto Fuel II through direct skin contact or inhalation of its vapors. Second, if ingested, it may result in death or, at least, cause severe disorders of the gastrointestinal tract, mucosa, and mucous membranes.

An Otto Fuel II spill kit must be readily available in the immediate area of the torpedo magazine. The Naval Sea Systems Command (NAVSEA) S6340-AA-MMA-010 provides complete guidelines for proper clean-up, firefighting, and emergency procedures.



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Submarines Torpedo Room

## Otto Fuel II Fire

In the event of an Otto Fuel II fire, the most efficient method of extinguishing this type of fire is the use of a finely dispersed water fog.

**NOTE:** Carbon dioxide fire extinguishers may be used on small Otto Fuel II fires.

Otto Fuel II must be stored alone and not with other fuels or oxidizers.

A placard of the safety precautions must be posted wherever torpedoes or Otto Fuel II is handled. The next four pages display the required safety precautions for Otto Fuel II.



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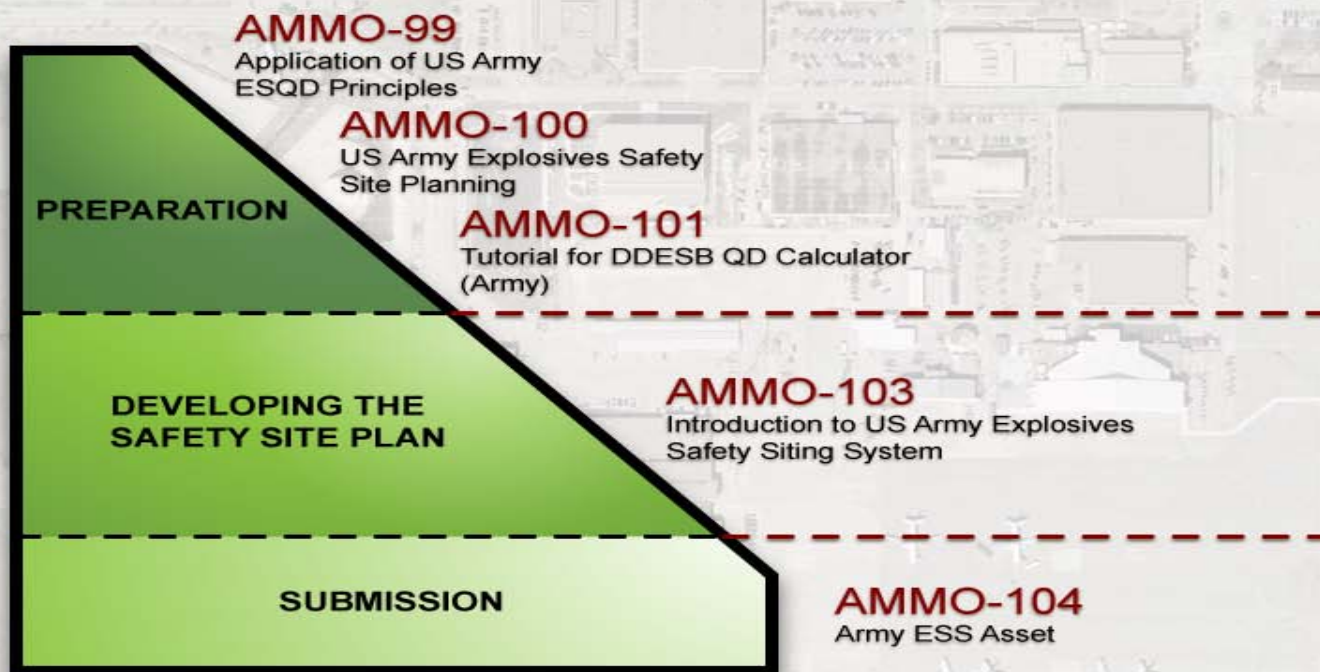
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# Explosives Safety Site Planning



## ARMY EXPLOSIVES SAFETY SITE PLANNING CURRICULUM



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Runway

## AE Storage

Taxiway

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# Explosives Safety Site Planning

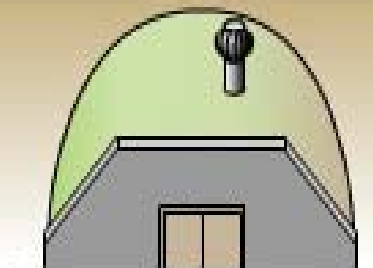


PES

ES

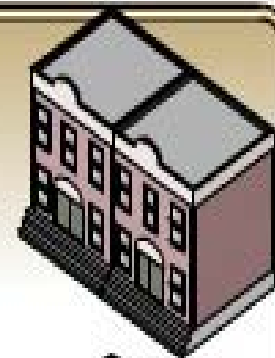
0'-99' No HD 1.2.1 No HD 1.2.2	100'-199' No HD 1.2.1 HD 1.2.2 = PC	200'-299' HD 1.2.1 = PC MCE < 100 lb HD 1.2.2 = PC	300' or more HD 1.2.1 = PC MCE = Any HD 1.2.2 = PC
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If the distance between the PES and ES is 100 feet or more, the PES may be filled to its physical capacity with HD 1.2.2

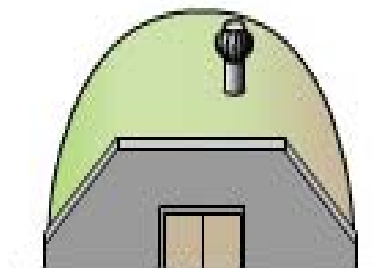


100' or more

HD 1.2.2 = Physical Capacity

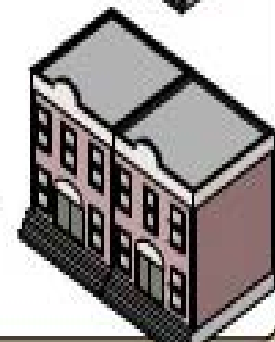


If the distance between the PES and ES is between 100' and 199', no HD 1.2.1 may be placed there



Between 100' and 199'

HD 1.2.1 = None



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# Explosives Safety Site Planning



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PE

How much distance is required between the ECM and public traffic route below? If no distance is required, enter "0" into the answer box. Click the View References button to see applicable tables.



Distance = ?



Public Traffic Route

ECM  
HD 1.1 = 70,000 lb

(Enter whole numbers only. No commas, quotes, units or decimals. Enter "max" for "physical capacity.")

Incorrect. Answer = 750. Find 70,000 lb of HD 1.1 NEWQD. Then locate the "PTRD From Rear" column. At the intersection of column 8 and 70,000 lb of NEWQD, you will see 750 feet.

REFERENCE: AMMO-99, Example 2

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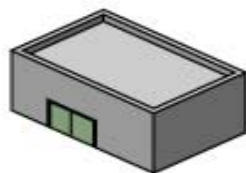


# Explosives Safety Site Planning



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PE  
How much HD 1.4 NEWQD can be stored in the AGS (H) (openings are NOT barricaded) below? If no NEWQD is allowed, enter "0" into the answer box. Click the View References button to see applicable tables.



AGS (H)  
HD 1.4 = ?

Distance = 430 ft



Navigable River

(Enter whole numbers only. No commas, quotes, units or decimals. Enter "max" for "physical capacity.")

Set Answer

Incorrect. Answer = max. A navigable river is considered a PTR. Find the "IBD/PTRD" column, look at the row for the distance of 100 feet or greater and then locate the "NEWQD" column. At the intersection of the "NEWQD" column and the "IBD/PTRD" row, you should determine the structure can store greater than 3,000 lb. NEWQD of HD 1.4. This equates to filling the magazine to its physical capacity. Footnote 3 applies.

REFERENCE: AMMO-99, Example 2

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# Electrical Explosives Safety



## ELECTRICAL EXPLOSIVES SAFETY CURRICULUM



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# Electrical Explosives Safety



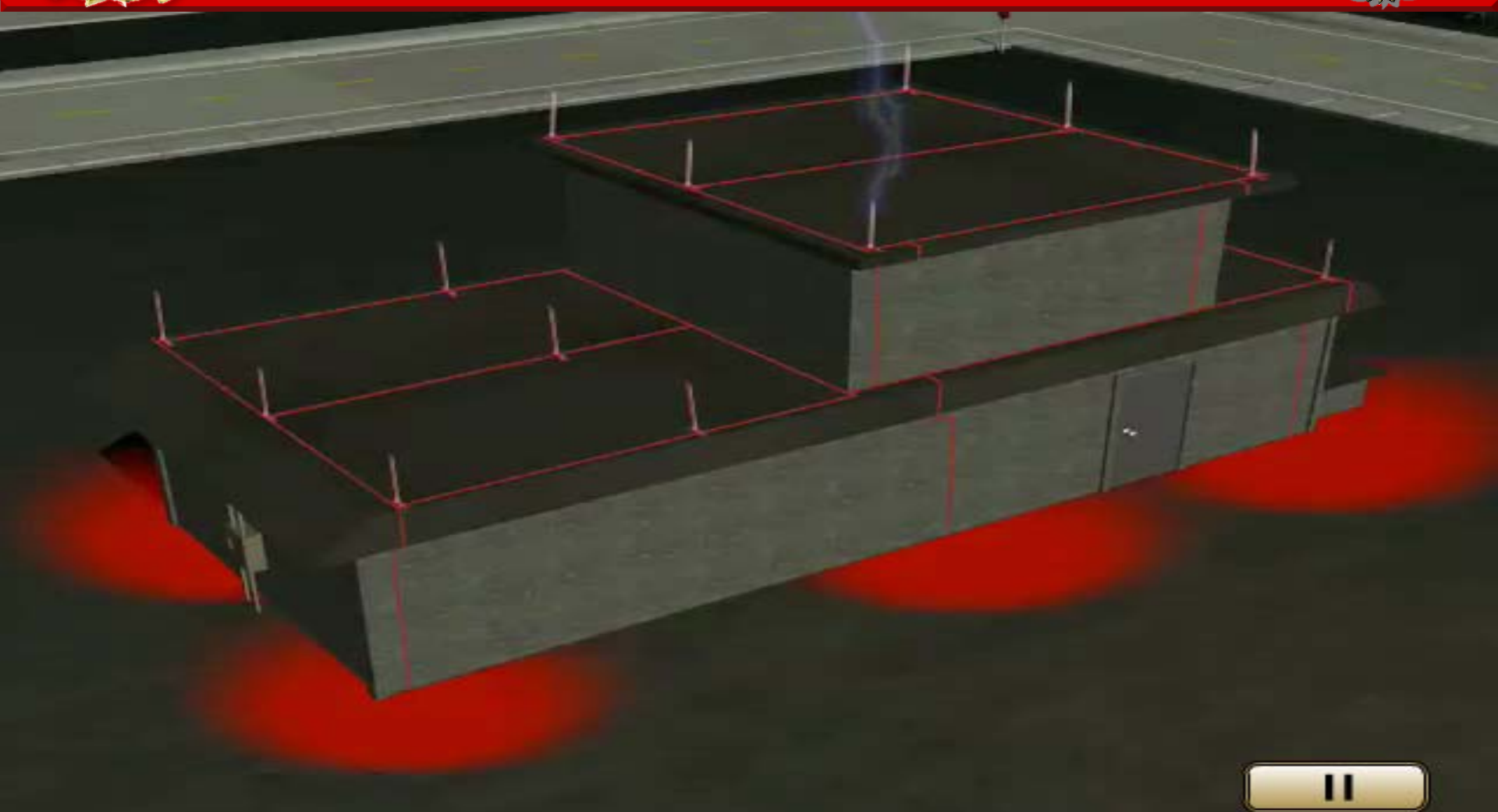
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# Electrical Explosives Safety



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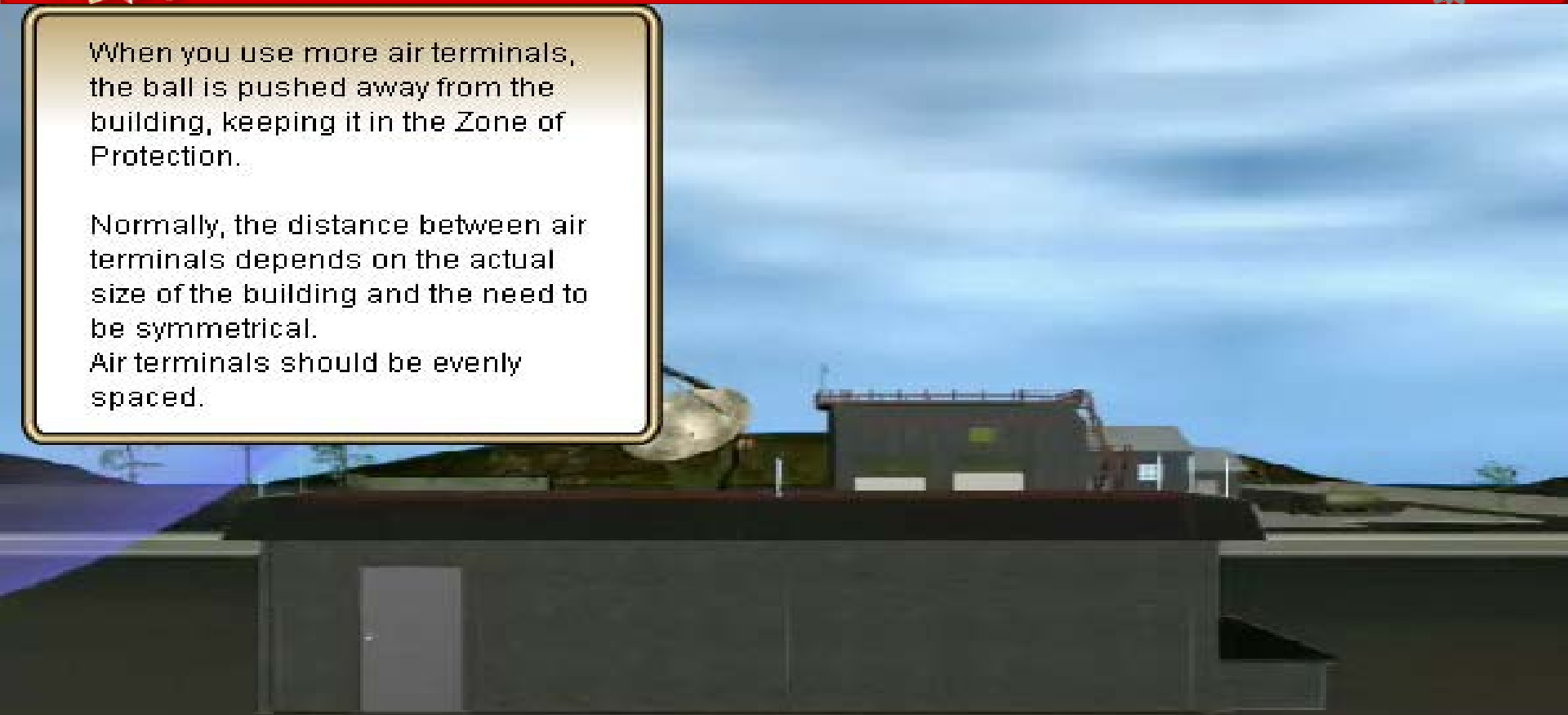


# Electrical Explosives Safety



When you use more air terminals, the ball is pushed away from the building, keeping it in the Zone of Protection.

Normally, the distance between air terminals depends on the actual size of the building and the need to be symmetrical.  
Air terminals should be evenly spaced.



**Side View**

Click for next step

PLAY

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